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Division of Mycology and Disease Survey

Volume XXIII Number 21

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BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

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IN THIS ISSUE

Vera K. Charles contributes some notes on entomogenous fungi, page 340.

Don E. Ellis reports a number of conifer diseases for the first time from the Southwest, page 341.

The distribution in Massachusetts of the yellow-red virosis (X-disease) of peach and chokecherry is reported by O. C. Boyd, page 341.

Some unusual or outstanding diseases occurring in Ohio this year are reported by C. C. Allison, page 342.

O. C. Boyd summarizes the weather and disease situation in Massachusetts in 1939, page 343.

Several diseases are newly reported from various localities, page 346, including bacterial ring rot of potato in Ohio, by C. C. Allison; smut on dahlias in California, by M. R. Harris; gray mold on gladiolus leaves in Oregon, by F. P. McWhorter; violet scab in Massachusetts, by O. C. Boyd; and persimmon wilt in Texas, by A. A. Dunlap.

October weather, page 347.

NOTES ON ENTOMOGENOUS FUNGI

Vera K. Charles

Fungi on Mosquitoes: Specimens of Anopheles quadrimaculatus were received from Dr. Mark F. Boyd of the International Health Division of the Rockefeller Foundation at Tallahassee, Florida, with the information that the adults in an insectary had been attacked by a fungus. An examination of the insects revealed the presence of two fungi, Beauveria bassiana (Bals.) Vuill., and Spicaria sp., both apparently parasitic. The two fungi were cultured and grew equally well on artificial media. This is the first time we have observed these fungi on mosquitoes, and as far as our information goes there is no published report of their occurrence on this host, although species of Entomophthora have been reported on mosquitoes.

A Fungus Parasite of Sweet Potato Weevils: Specimens of sweet potato weevils, Cylas formicarius, attacked by a fungus were collected at St. Simons and Sea Islands, Georgia, in September 1939, and sent by Mr. K. L. Cockerham at Sunset, Louisiana, to D. J. Caffrey, of the Division of Truck Crop and Garden Insect Investigations. This material was referred to us and upon examination was found to be parasitized by a species of Fusarium. It is of interest to note that the Mycological Collections have two other collections of this fungus on sweet potato weevils. The first collection was made by W. B. Hollingsworth in 1932 at Picayune, Mississippi, and the second by K. L. Cockerham at the Biloxi, Mississippi Laboratory. In regard to the parasitism of this fungus, Mr. Cockerham stated in a letter dated February 25, 1935, that a large percentage of the insectary specimens were killed by it. It may be mentioned that in this second collection another fungus, Beauveria globulifera (Speg.) Pic. was also present, but both species of fungi appeared to be equally parasitic. The Fusarium is being studied in culture, and later will be given a specific determination.

A Fungus on Periphyllus lyropictus: While collecting in the vicinity of Randolph, New Hampshire, this summer, Hydrangea arborescens L. was found to be heavily infested with the Norway maple aphid, Periphyllus lyropictus, which however was almost completely parasitized by Empusa fresenii Now. Both conidia and resting spores were found to be present in great abundance. As far as our information goes, this is the first record of this species on this host.

(Division of Mycology and Disease Survey, Bureau of Plant Industry).

CONIFER DISEASES HITHERTO UNREPORTED FROM THE SOUTHWEST

Don E. Ellis

So far as the writer has been able to determine, the following forest tree diseases observed in the spring and summer of 1939 are here reported for the first time from the Southwest.

Needle blight of Douglas fir (Pseudotsuga taxifolia (Lamark.) Britt.) caused by Rhabdocline pseudotsugae Syd. was observed in limited areas in the Graham mountains near Safford, Arizona, in May and June. An imperfect fungus which resembles Rhabdogloeum pseudotsugae Syd. was also associated with early stages of the disease.

The needle cast fungus Elytroderma deformans (Weir) Darker was found on pinon (Pinus edulis Engelm.) in the Prescott National Forest, Arizona, in April. The same fungus was also rather widespread on ponderosa pine (Pinus ponderosa Dougl.) in the Prescott, Coconino, and Kaibab National Forests of Arizona in May and June. It was often associated with witches-broom formation on both hosts.

A canker disease of ponderosa pine has recently been observed in Arizona and New Mexico. The symptoms are similar to those of a canker disease of Pinus ponderosa and P. contorta Loud., described by Weir[1] in Montana in 1921, and the associated fungus closely resembles Cenangium piniphilum Weir. In New Mexico the disease was fairly common in several localities in the Lincoln National Forest, while in Arizona it was observed only in the Graham mountains in the Crook National Forest. Numerous young trees were deformed and a few appeared to have died as a result of the disease. In localized areas, near Ruidoso, New Mexico, as much as 60 percent of the ponderosa pine reproduction was found to be infected. For the most part, however, only suppressed seedlings and saplings between the ages of 5 to 20 years, in mixed stands at high elevations (7000 to 9000 ft.), were affected. The disease appears to be unimportant in the Southwest.

(Civilian Conservation Corps, and Division of Forest Pathology, Bureau of Plant Industry).

DISTRIBUTION OF X-DISEASE OF PEACHES IN MASSACHUSETTS

O. C. Boyd

A special effort was made this year, in cooperation with county agents, to observe the distribution and severity of X-disease [yellow-red virosis]. In general, the disease was definitely more prevalent on both

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[1] Weir, James R. Cenangium piniphilum n. sp., an undescribed canker-forming fungus on Pinus ponderosa and P. contorta. Phytopath. 11: 294-296. 1921.

peach and chokecherry in the southern half of the State, barring the 3 southeastern counties, than in the northern half. The survey in Bristol County was not at all comprehensive, but I failed to see the disease on either chokecherry or peach in the area from Dighton to Westport and Dartmouth. No survey was made at all in Plymouth and Barnstable Counties. Neither did we receive any reports of suspected cases from those areas. However, the disease is very prevalent on chokecherry throughout the southern halves of Middlesex and Worcester Counties, all through Hampden and Hampshire Counties, and in the southern half of Berkshire County; and, wherever peach orchards were located near diseased chokecherries, the orchards too were diseased. Northern Berkshire County was not surveyed, but Franklin County was, and the disease was observed in the southernmost towns only. None was seen even in Charlemont or Shelburne or Orange.

Although the northernmost towns of Worcester County were not surveyed, the corresponding ones of Middlesex County were. There the disease was not observed in Ashby, Pepperell and other northern borderline towns. The northern boundary of distribution appeared to be roughly along Ayer, Westford, Billerica, Winchester. Most of two days were spent in Essex County and an abundance of chokecherries and peach trees were seen but there was no indication of X-disease on either.

It is felt that this disease already is far more damaging to the peach industry of the State than any other one or two diseases. Furthermore, indications point to even greater possibilities for losses in the future because it is not yet distributed throughout all sections of the State on either the chokecherry or the peach. No small number of growers this year attempted to eradicate chokecherries near young peach orchards and near prospective sites for orchards. A still larger number have expressed intentions to do so next year.

(Massachusetts State College Crop Disease Notes, October 27).

SOME DISEASES OF NOTE IN OHIO THIS YEAR

C. C. Allison

Besides bacterial ring rot of potato, reported on page 346, some of the unusual or outstanding diseases that occurred in this State this summer are as follows:

Rhizoctonia cankers [*R. solani*] on potato tubers were noted on specimens grown in muck soil.

A great deal of damage was noted on corn from a complication of Stewart's disease [*Aplanobacter stewarti*], leaf blotch caused by Helminthosporium, and various stalk rots.

Bitter rot [Glomerella cingulata] of apples was more widespread in the southern half of the State than usual this year.

Spotted wilt [virus] of tomatoes destroyed the crop in a few local fields near Cleveland. These fields were in the vicinity where spotted wilt had previously been reported on greenhouse-grown tomatoes. Most of these growers combine vegetable and ornamental greenhouse production.

(Extension Plant Pathologist. November 6).

SUMMARY OF WEATHER AND DISEASE SITUATIONS IN MASSACHUSETTS IN 1939

O. C. Boyd

The Weather

In general, except for April, the first half of the growing season was notably dry with a scarcity of, or at least with light infections of most foliage and fruit diseases of bacterial or fungus origin. The month of July was still drier than May or June, and likewise was warmer than normal. August, too, was below normal in rainfall and registered nearly 5°F. higher than normal for mean temperature. September, which in most years ushers in a fall rainy season, also was considerably below normal for total precipitation, but was about normal for mean temperature. So, all in all, it was a warm, dry season for a greater part of the growing period for most crops. The effect of the drought, however, was more keenly felt in the eastern half of the State, where the rainfall was lighter generally than in the Connecticut Valley and in the western hill towns.

The rainfall, mean daily temperature, and number of infection periods for Amherst during the 1939 season are summarized in the following table:

Month:	Precipitation (Inches)		Mean temperature (°F.)		Dates of infection periods
	1939	Normal	1939	Normal	
April:	4.56	3.35	42.5	45.7	17-*19; 26-28
May	2.15	3.60	59.7	57.1	9-10; 22*-23; 28-29
June	3.21	3.51	66.7	65.7	8; 13*-14; 25; 29*-30
July	2.30	4.10	71.2	70.8	27-31
Aug.	3.89	4.08	73.5	68.6	3*-4; 20*-21
Sept.	2.97	4.26	61.4	61.7	8; 26*-27

*Infection periods that were general throughout most of the State.

Disease Situation

Apples: The apple scab [Venturia inaequalis] picture has not changed much from that described previously (PDR 23: 235. No. 14). There was less fruit infection at harvest than in most seasons, and, judging from the weather in September, there should be little trouble with storage scab later on. Growers who experienced marked leaf infections earlier in the season and failed to eradicate the spots during June or July, found varying amounts of scab on most of the susceptible varieties at harvest.

Cedar rusts, both the quince rust [Gymnosporangium clavipes] and the common apple rust [G. juniperi-virginianae] turned out to be more prevalent and damaging than was anticipated during July. The infection periods for those diseases were later in the season than customary, and the cluster cups generally did not reach maturity until the first half of August or later. Black rot [Physalospora obtusa] on foliage and fruit was somewhat less noticeable than usual, while bitter rot [Glomerella cingulata] was more prevalent, especially in the southeastern part of the State, than in most seasons. One outstanding infection was observed on the fruit of Rhode Island Greening during September.

The most outstanding injury in apples this year was the nonparasitic corky-core disease resulting from the drought coupled with boron deficiency. As in former years, it was most damaging to McIntosh and Cortland, although it was present in other varieties, including Baldwin. Baldwin spot, or bitter pit, likewise was somewhat more prevalent in the orchard than in most past seasons, and judging from the character of the weather in September, additional development may be expected in some of the late varieties in storage. About the usual amount of spray injury, mostly from the late July cover spray, developed during late August and early September in some orchards, although in the majority of the commercial orchards there was less injury late in the season, as well as in the earlier months, than usual.

Peaches: Small amounts of bacterial spot and scab, and still less brown rot [Bacterium pruni, Cladosporium carpophilum, Sclerotinia fructicola], developed in commercial peach orchards this year. Arsenical injury generally was not so pronounced as usual, although a few cases of severe early season injury were observed in which the zinc-lime corrective was omitted from the arsenical sprays. (For report on X-disease, see page 341).

Grapes: Black rot [Guignardia bidwellii] was the only disease of any consequence in grapes generally, and it was not nearly so prevalent as in most past seasons.

Vegetables: The outstanding diseases of vegetable crops that prevailed after July 10 were cucurbit bacterial wilt [Bacillus tracheiphilus], bean blight (Bacterium phaseoli), an occasional heavy infection of early and late blights [Cercospora and Septoria spp.] of celery under irrigation,

downy mildew [Pseudoperonospora cubensis] of cucumber and muskmelon, scattered cases of black rot and club root[Bacterium campestre and Plasmodiophora brassicae] of cabbage and cauliflower, and moderate infections of Cercospora [apii carotae] and Macrosporium [carotae] leaf blights of carrots mostly in the Connecticut River Valley area. Early blight [Alternaria solani] became severe in tomatoes late in the season on a number of farms in Western Massachusetts, but too late to do much damage. One heavy infection of bacterial canker [Aplanobacter michiganense] of field tomatoes was observed in Hampden County during the last week of July. The grower reported that the plants were grown in his own sash house from locally purchased seed.

Potatoes: The only disease that was outstanding this year in all potato sections was Rhizoctonia stem-rot [R. solani]. It appeared to cause more damage on the low lands of the Connecticut River Valley and in the heavier, moist soils of the western hill towns than elsewhere. Late blight [Phytophthora infestans] took a brief flare in a few fields in Bristol County during mid-July, then remained inactive until the first week of August when it again became prominent in a few scattered unsprayed or poorly protected fields in the lower part of the county. No further development occurred until after the rains of the first ten days of September, when some fields in the western part of the State that were still green and putting on additional growth after the spraying season closed, became infected. Tuber rot was not uncommon in such fields but it caused very little loss generally.

Virus diseases caused only slight losses in the commercial acreage for most of the growers use certified seed. Heavy cases of leaf-roll, spindle tuber and mosaics were the rule in gardens and small fields planted from non-certified stock. Fusarium wilt and black leg [Fusarium sp., Bacillus phytophthorus] were about normal in Irish Cobblers, and were decidedly worse in that variety than in others.

The occurrence of bacterial wilt and soft rot or ring-rot [Bacterium sepedonicum] and of Phytophthora pink-rot was reported in the October 15 issue (page 322). In the case of pink-rot the grower reported that the disease was present during harvest a year ago along with some late blight rot. He reported this fall picking up 60 barrels of decayed tubers in one 12-acre field. No doubt, as many, or perhaps more, had rotted and disintegrated before digging.

In spite of the dry growing season, on the better lands in the Connecticut Valley and in the western hill towns, potatoes yielded exceptionally well. Yields of 400 bushels per acre were not at all uncommon for Chippewa and Green Mountains, and an occasional yield of 500 bushels was recorded.

Onions: As anticipated in July (PDR 23: 229), both seed and set onions yielded poorly, not because of disease but owing to the effect of dry weather during May, June, and July. No downy mildew [Peronospora

destructor] was reported, and almost no blast [non-parasitic], even in the seed onions. However, it is estimated by members of the Agronomy Department staff that the limited acreage of seed onions yielded no more than 50 percent of a normal crop, and the set onion crop ran to about 60 percent of a normal yield. About the normal amount of bacterial soft rot [Bacillus carotovorus] developed in the crop during the late summer months, and at present the Fusarium basal decay is the outstanding form of disease, while Botrytis neck rot is just starting to show up.

Tobacco: The striking features about the tobacco crop this year were the moderate to large yields of high quality tobacco with minimum losses from diseases. Although angular leaf spot [Bacterium angulatum], which was so widespread and damaging in the field last year, was present in most fields this year, it remained strictly suppressed, being inconspicuous and limited to the bottom leaves in most instances. Only an occasional light infection of wildfire [B. tabacum] was reported late in the season. Furthermore, both black root-rot [Thielaviopsis basicola] and brown root-rot [undet.] were less damaging than in most past seasons, according to a verbal report by C. V. Kightlinger, who attributed the reduced activity of the black root-rot organism mostly to the comparatively warm, dry soil-season. Mosaic [virus] was the one disease that proved to be about normal. It no doubt is the most common and widespread disease in tobacco year after year, and perhaps also the most damaging one year in and year out.

Ornamentals: Aside from the usual late season occurrence of powdery mildew on various flowers, trees, and shrubs, and of leaf-blotch [Guignardia aesculi] on horsechestnut, diseases of these plants from mid-season on were comparatively inconsequential this year. However, drought injury was outstanding in most sections of the State in many ornamental trees and shrubs as well as in trees in the forest. Pines and arborvitae were perhaps most commonly affected in the forms of "leaf blight" and premature defoliation. Many newly or recently set trees failed to become established on streets and in lawns and parks, where watering was inadequate.

(Massachusetts State College Crop Disease Notes. October 27).

SOME REPORTS OF FIRST APPEARANCE

BACTERIAL RING ROT OF POTATO IN OHIO: Bacterial ring rot [Bacterium sepedonicum] of potatoes was definitely diagnosed from specimens received from Wood County. (C. C. Allison, Extension Plant Pathologist. November 6).

SMUT OF DAHLIAS IN CALIFORNIA: In San Francisco, during September 1939, a disease of dahlias identified as smut and caused by the fungus Entyloma dahliae Syd. was observed. This same organism was found in the same general area for the first time in August 1935 by J. B. Steinweden, Deputy Agricultural Commissioner. In both instances the fungus was confined

to a single planting. Both of these plantings covered less than one-tenth of an acre. Before flower buds appeared the plants were watered by overhead irrigation. Under such conditions the fungus spread rapidly, causing an extensive leaf spotting. When flower buds appeared, overhead irrigation was discontinued and the disease showed a marked decline. New infected spots on the leaves were rare or absent and a commercial cutting of flowers was possible. This fungus is present in English gardens, but elsewhere in the United States has apparently been reported only from New Jersey. (M. R. Harris, California State Department of Agriculture).

BOTRYTIS ON GLADIOLUS LEAVES IN OREGON: A strain of Botrytis cinerea attacked maturing gladiolus foliage in a field near Portland, Oregon, and disfigured the foliage sufficiently to attract the grower's attention. The infection may have followed a bacterial leaf spot common during the early part of the season but it definitely correlates with a rainy period during the ripening of the foliage. Leaf spots are large, purple, marginate, oval, or extended with the blade of the leaf, at intervals studded with stubby unbranched conidiophores of Botrytis. Spores washed down into the sheathing blades about the flower stem have initiated necrotic areas showing characteristic Botrytis hyphal invasion. This is the first record we have of Botrytis attacking gladiolus foliage in Oregon. (Frank P. McWhorter, Division of Fruit and Vegetable Crops and Diseases. October 31).

SCAB ON CULTIVATED VIOLETS IN MASSACHUSETTS: Specimens of the fungous disease of cultivated violets known as scab (Sphaceloma violae) were received from Gloucester this month. This constitutes the first report of this disease from Massachusetts. Diagnosis was confirmed by Dr. Anna E. Jenkins, U. S. Bureau of Plant Industry. (O. C. Boyd, Massachusetts State College, October 27).

CEPHALOSPORIUM WILT OF PERSIMMON IN TEXAS: The wilt disease of persimmon, Diospyros virginiana, which has been so destructive in the Southeastern States was found at Dallas in June. The disease spread rapidly in a small group of young native trees growing near the city limits. Cultures of the fungus were identified by John A. Stevenson of the Bureau of Plant Industry as the same form of Cephalosporium earlier recognized as the cause of this wilt. (A. A. Dunlap, Texas Agricultural Experiment Station, College Station).

OCTOBER WEATHER

(From U. S. Department of Agriculture, Weather Bureau, Weekly Weather and Crop Bulletin for week ending November 7, 1939).

The weather in October 1939 was characterized by relatively high temperatures over most of the country and scanty rainfall in large areas. Figure 1 shows that the mean temperature for the month was above normal in all sections, except a narrow strip from the upper Lake region westward to

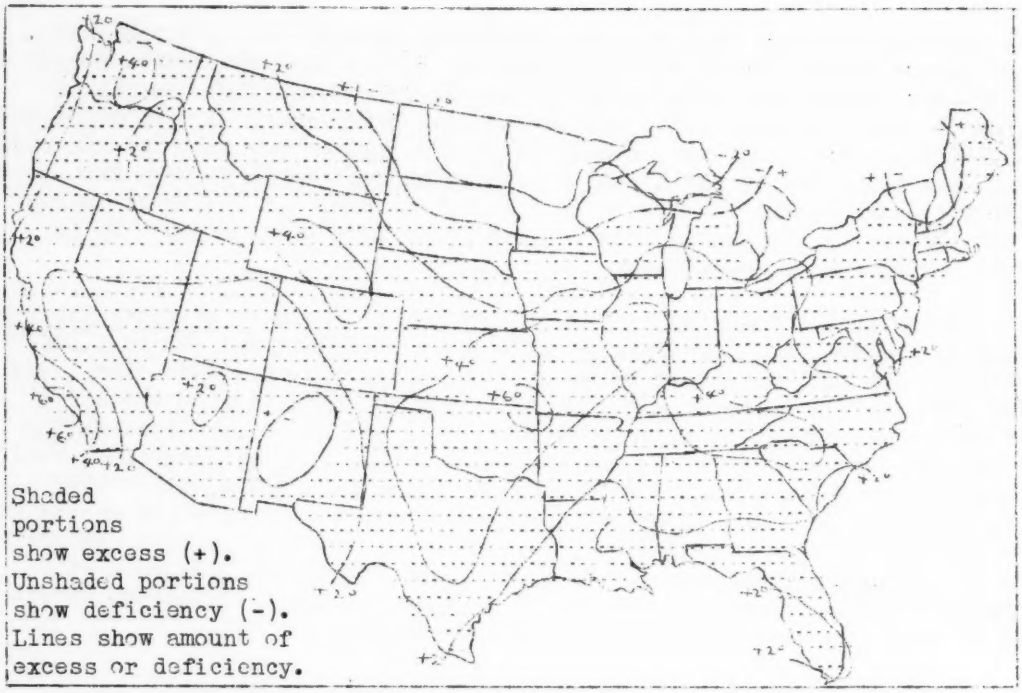

Figure 1. Departure of mean temperature from the normal for October 1939.

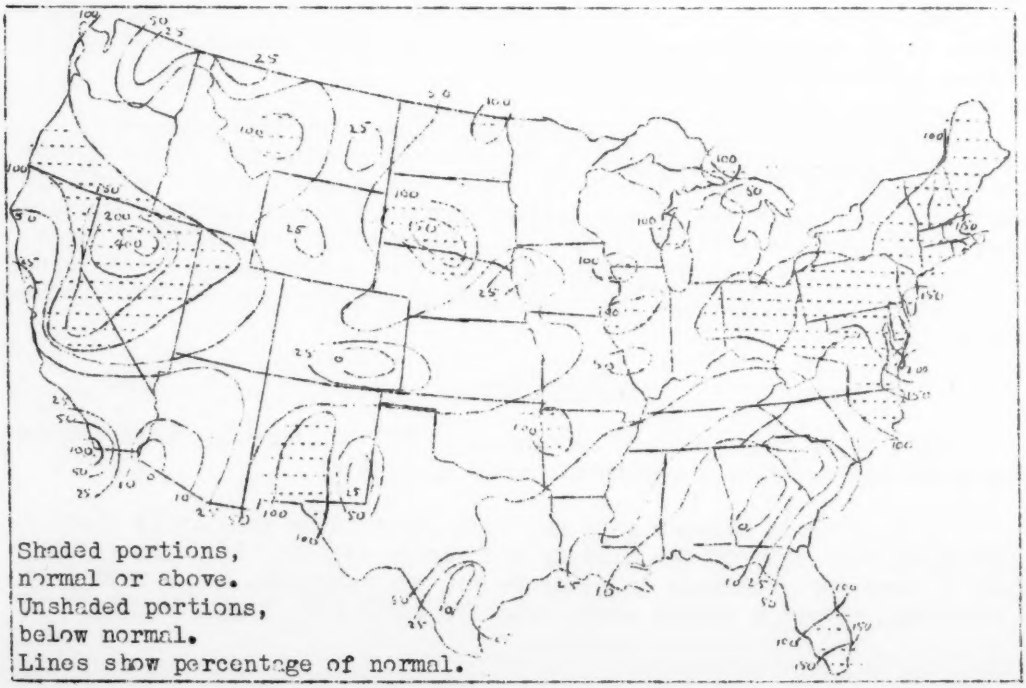

Figure 2. Percentage of normal precipitation for October 1939.

North Dakota, and locally in the Northeast and Southwest. Over a broad belt extending from the Carolinas, Georgia, and Alabama northwestward over the Central Plains, the monthly means were from 3° to 6° above normal. Also, over a large northwestern area they were mostly from 2° to 4° higher than usual. The Northeastern States from the Potomac Valley northward, and also a large southwestern area, had about normal warmth, except that extremely warm weather prevailed in southern California. At Los Angeles the temperature for the month averaged 7° above normal.

Figure 2 shows that precipitation was very unevenly distributed, but much the greater portion of the country had subnormal amounts, especially the Southeast and the trans-Mississippi area. In the Eastern States abundant rain occurred in most sections from the Potomac Valley northward, some localities having more than one and one-half times the monthly normal. In contrast, it was one of the driest months of record in the Southeastern States, with a considerable area having less than 10 percent of normal rainfall and some stations reporting no measurable amount for the entire month. Another area of marked deficiencies is shown for the southern Great Plains, where some stations reported no measurable rainfall and others up to only 25 percent of normal; part of the far Southwest had similar conditions. The Great Basin received substantial to abnormally heavy amounts, northern Nevada having four times the monthly normal.